CATERPILLAR

Service Manual

416B BACKHOE LOADER

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Heavy Equipment Manuals

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Product: BACKHOE LOADER
Model: 416B BACKHOE LOADER 8ZK01989
Configuration: 416B Backhoe Loader 8ZK00001-05999 (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly
Alternator - Bosch K1 / N1
Media Number -SENR3685-02 **Publication Date -01/09/2013** **Date Updated -16/09/2013**

i05064230

Alternator - Assemble

SMCS - 1405-016

Assembly Procedure

Cleanliness is an important factor. Before assembly, all parts should be thoroughly cleaned in cleaning fluid. Allow the parts to air dry. Wiping cloths or rags should not be used to dry parts. Lint may be deposited on the parts which may cause problems in the future. Inspect all parts. If any parts are worn or damaged, use new parts for replacement.

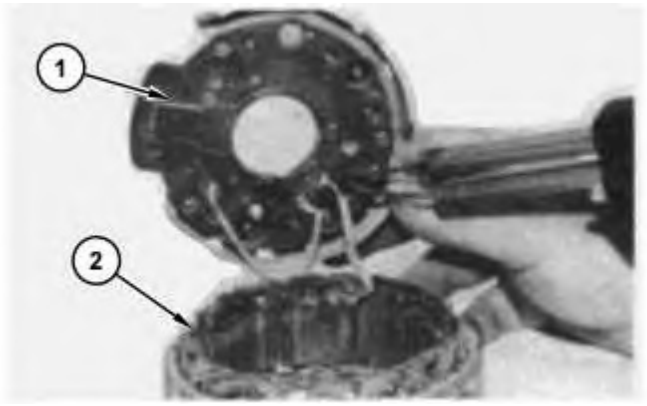

Illustration 1 g03230839

(1) Rectifier

(2) Stator

1. Connect and solder the stator leads to the positive (+) diodes of rectifier (1) .

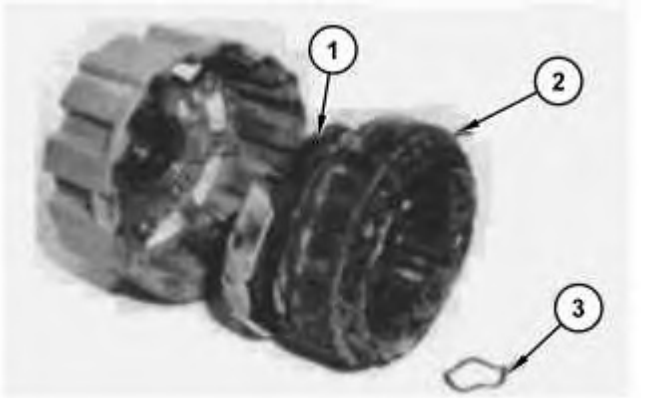

Illustration 2 g03230840

(1) Rectifier

(2) Stator

(3) Position wave washer

2. Position the insulators on the rectifier terminal studs. Position rectifier (1), and stator (2) into the rear frame, and install the three screws. Install the terminal insulators, washers, and nuts. Position wave washer (3) into the bearing bore of the rear frame.

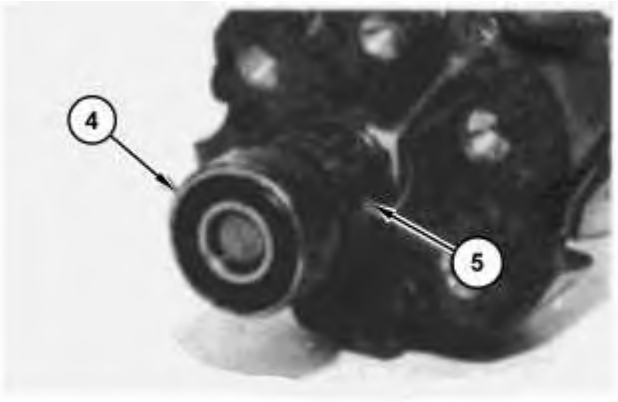

Illustration 3 g03230842

(4) Rear bearing

(5) Slip ring

3. Install slip ring (5) on the rotor. Connect and solder the rotor leads to the slip ring (5). Install rear bearing (4) .

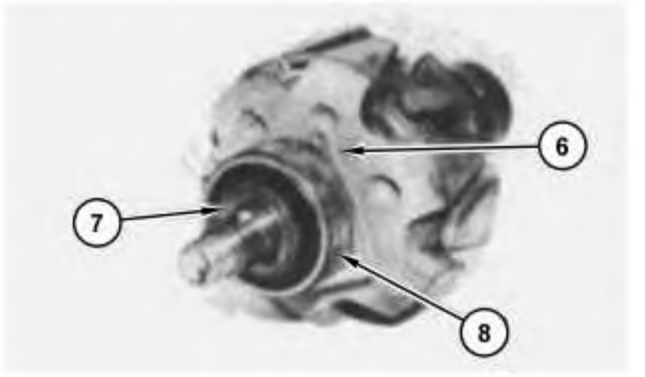

Illustration 4 g03230845

(6) Bearing cover

(7) Spacer

(8) Front bearing

4. Install bearing cover (6), front bearing (8), and spacer (7) on the rotor.

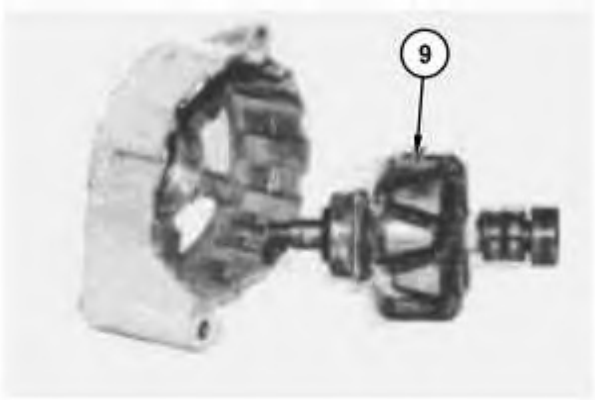

Illustration 5 g03230846

(9) Rotor

5. Install rotor (9) and the four screws into the front frame.

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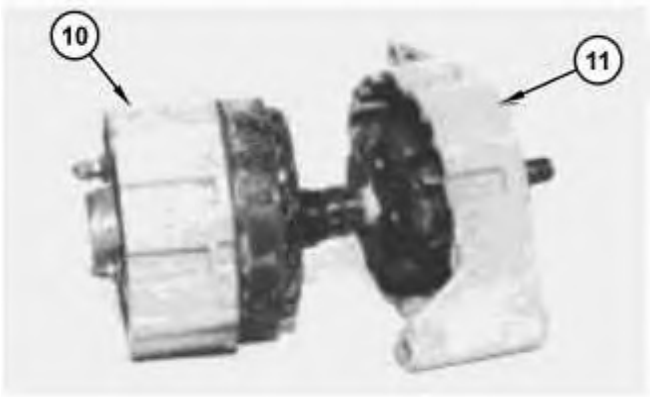

Illustration 6 g03230848

(10) Stator assembly

(11) Rotor assembly

6. Assemble front frame and rotor assembly (11) into rear frame and stator assembly (10). Make sure that the wave washer is fixed in the rear frame bearing bore. Align the front and rear frame marks made at disassembly for correct assembly. Install the four screws.

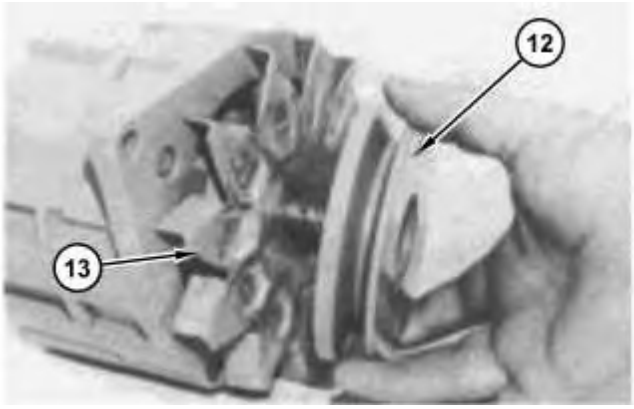

Illustration 7 g03230896

(12) Pulley

(13) Fan

7. Install the key, fan (13), pulley (12), washer, and pulley nut. Tighten the nut to a torque of:

3E-7295 Charging Alternator Gp, and **9X-0341** Charging Alternator Gp ... 70 ± 5 N·m (52 ± 4 lb ft)

8C-5535 Charging Alternator Gp, **7T-2876** Charging Alternator Gp, **2Y-4212** Charging Alternator Gp, and **2Y-8310** Charging Alternator Gp ... 35 ± 10 N·m (26 ± 7 lb ft)

9W-3043 Charging Alternator Gp ... 50 ± 5 N·m (37 ± 4 lb ft)

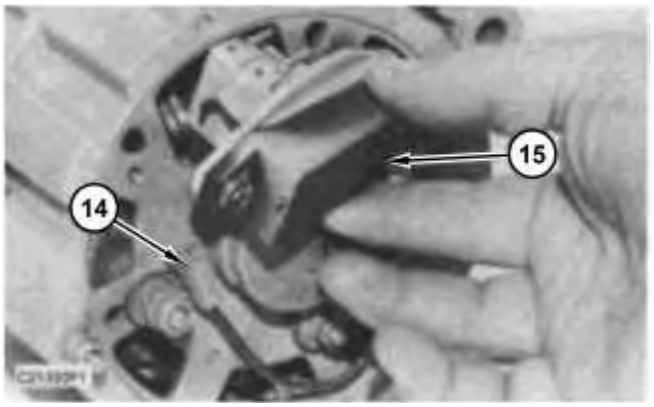

Illustration 8 g03230899

(14) Capacitor lead

(15) Regulator

8. Install the capacitor and connect capacitor lead (14) to the back of the alternator.
9. Install regulator (15) .

End By: Install the alternator on the machine. Refer to Disassembly and Assembly, "Alternator - Install" for the machine that is being serviced.

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Product: BACKHOE LOADER
Model: 416B BACKHOE LOADER 8ZK01989
Configuration: 416B Backhoe Loader 8ZK00001-05999 (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly
Alternator - Bosch K1 / N1
Media Number -SENR3685-02 **Publication Date -01/09/2013** **Date Updated -16/09/2013**

i05060896

Alternator - Disassemble

SMCS - 1405-015

Disassembly Procedure

Start By:

A. Remove the alternator. Refer to Disassembly and Assembly, "Alternator - Remove" for the machine that is being serviced.

Note: The Disassembly and Assembly that follows is of a K1, 12V **7T-2876** Charging Alternator Gp. The other alternators are similar.

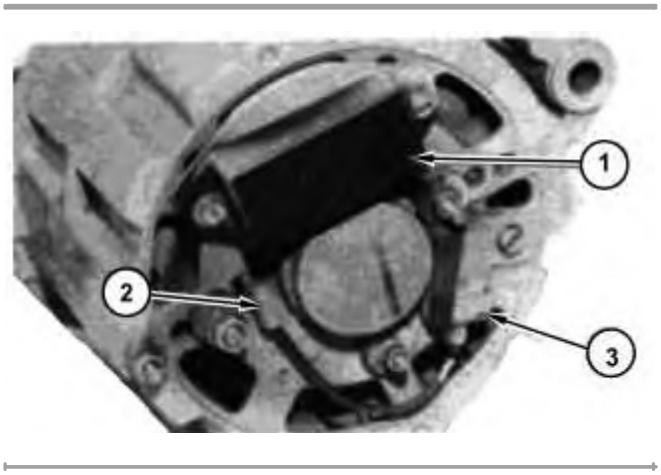

Illustration 1 g03228038

(1) Regulator

(2) Capacitor lead

(3) Capacitor

1. Remove the two screws and regulator (1) .
2. Disconnect capacitor lead (2) from the back of the alternator. Remove the screw and capacitor (3) .

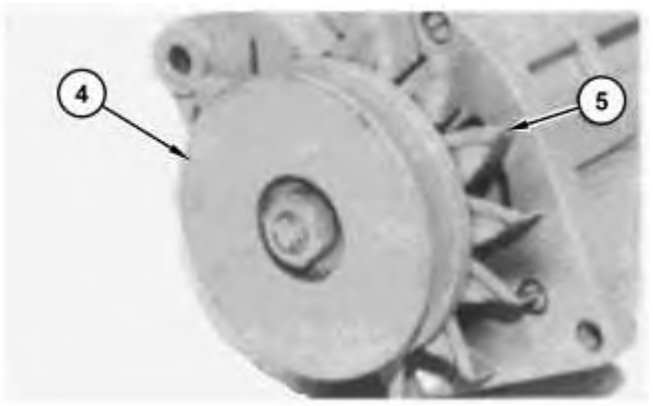

Illustration 2 g03228056

(4) Pulley

(5) Fan

3. Remove the pulley nut, washer, pulley (4), fan (5), and the key from the rotor shaft.

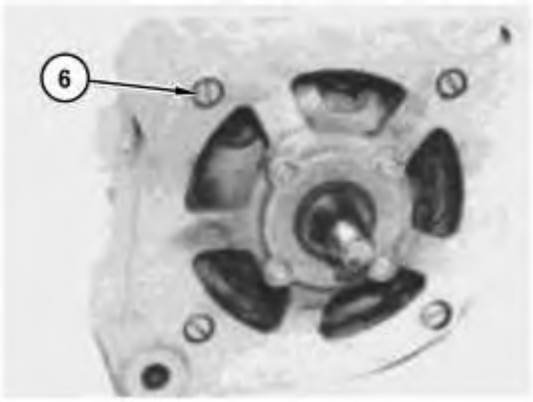

Illustration 3 g03228057

(6) Screws

4. Mark the front and rear frame assemblies for proper assembly. Remove four screws (6) (one has a nut on it on the back of the alternator).
5. Separate the front frame and rotor assembly from the rear frame and stator assembly. Watch for the wave washer, at the back of the rear frame assembly, to fall out.

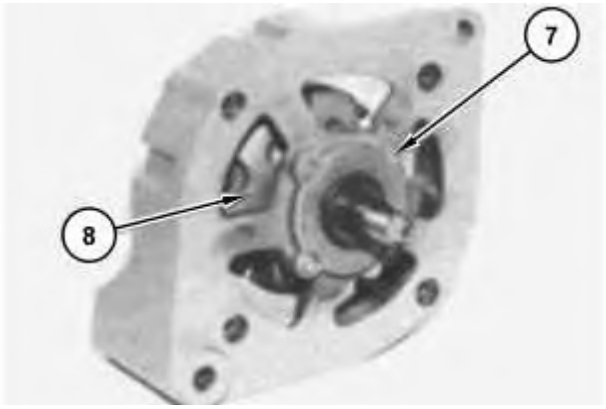

Illustration 4 g03228058

(7) Screws

(8) Rotor

6. Remove four screws (7), and rotor (8) from the front frame.

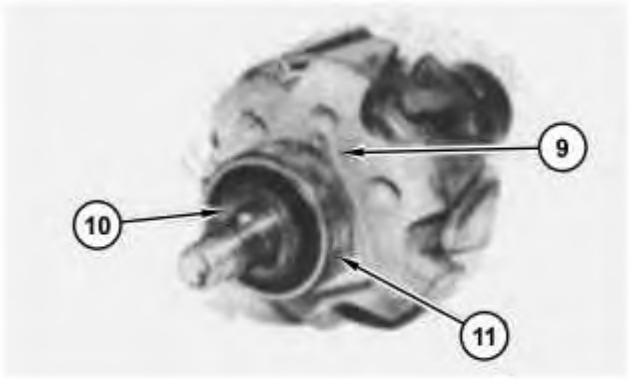

Illustration 5 g03228059

(9) Bearing cover

(10) Spacer

(11) Front bearing

7. Remove spacer (10), and front bearing (11), with a suitable puller. Remove bearing cover (9) from the rotor (8) .

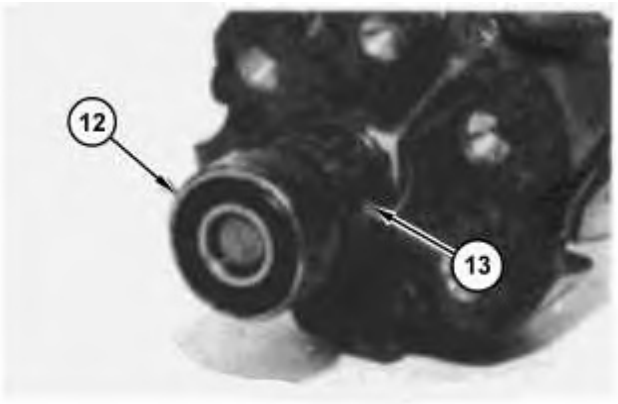

Illustration 6 g03228076

(12) Rear bearing

(13) Slip ring

8. Remove the rear bearing (12) with a suitable puller. Unsolder both rotor winding leads from slip ring (13). Remove slip ring (13) with a suitable puller.

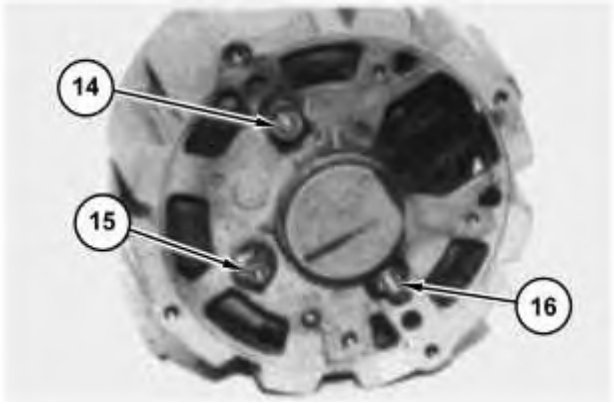

Illustration 7 g03228080

(14) terminal nuts

(15) terminal nuts

(16) terminal nuts

9. Remove terminal nuts (14), (15), and (16). Remove all of the washers and insulators.

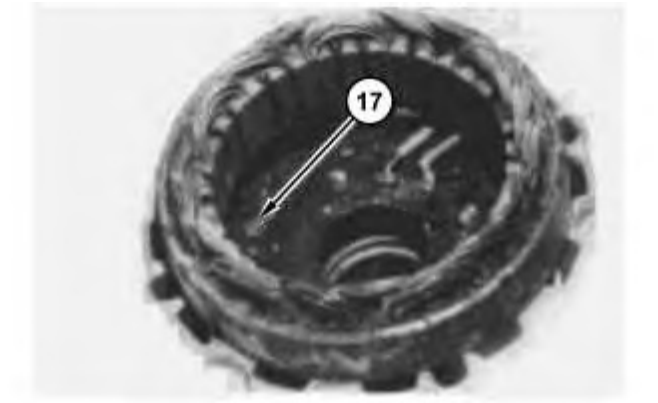

Illustration 8 g03228097

(17) Screws

10. Remove three screws (17). Remove the stator and rectifier assembly from the rear frame. Remove the remaining insulators from the terminal studs.

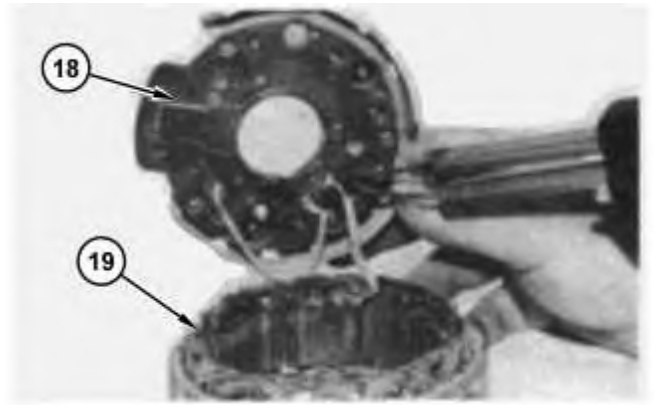

Illustration 9 g03228116

(18) Rectifier

(19) Stator

11. Unsolder the three stator leads and separate rectifier (18) from stator (19) .

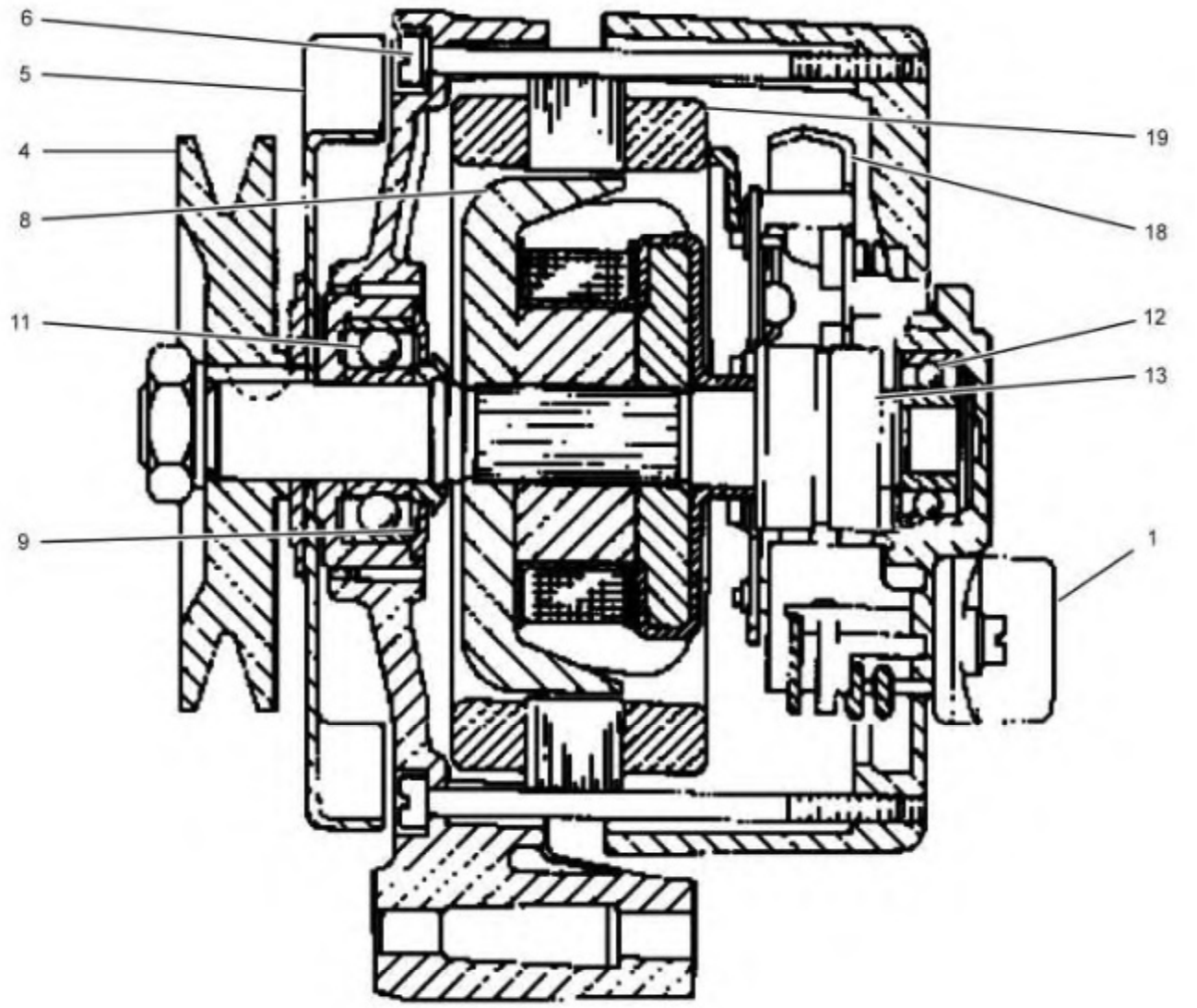

Illustration 10 g03228119

K1 Alternator

(1) Regulator

(4) Pulley

(5) Fan

(6) Screws

(8) Rotor

(9) Bearing cover

(11) Front bearing

(12) Rear bearing

(13) Slip ring

(18) Rectifier

(19) Stator

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Product: BACKHOE LOADER
Model: 416B BACKHOE LOADER 8ZK01989
Configuration: 416B Backhoe Loader 8ZK00001-05999 (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly

RA1.2, R1.4, R2.0, R2.2, R2.5, R2.7, R3.0, R4.5 and R5.5 Series Reduction Starting Motors

Media Number -SENR3828-02 **Publication Date -01/07/1999** **Date Updated -09/10/2001**

i01107056

General Information

SMCS - 1004-010; 1004-029

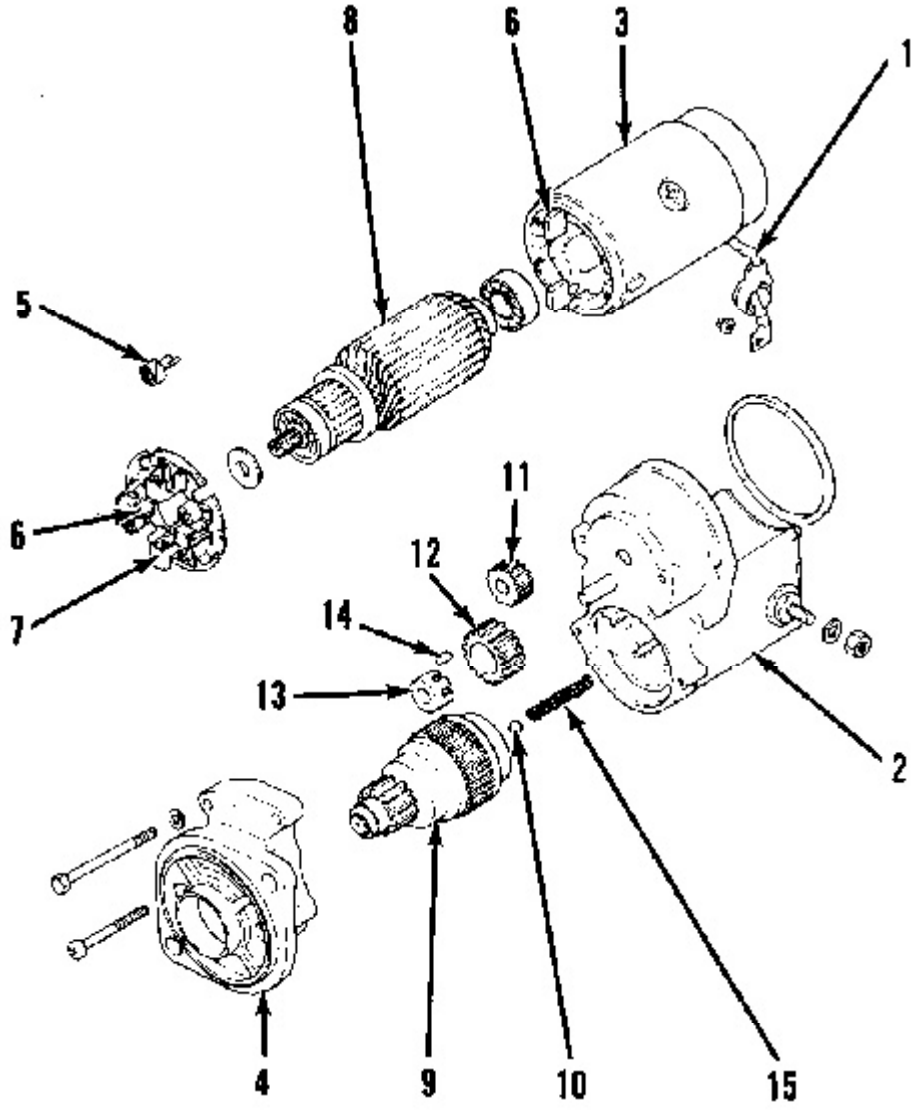

Illustration 1 g00585231

R2.0 Series Reduction Starting Motor

(1) Motor terminal lead wire

(2) Solenoid

(3) Case of the starting motor

(4) Drive end housing

(5) Brush springs

(6) Brushes

(7) Brush holder

(8) Armature

(9) Overrunning clutch

(10) Steel ball

(11) Armature reduction gear

(12) Idler gear

(13) Retainer

(14) Roller

(15) Return spring

Note: The following information is for the disassembly and assembly of a "R2.0 series" starting motor. All other series of starting motors are similar.

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Product: BACKHOE LOADER
Model: 416B BACKHOE LOADER 8ZK01989
Configuration: 416B Backhoe Loader 8ZK00001-05999 (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly
RA1.2, R1.4, R2.0, R2.2, R2.5, R2.7, R3.0, R4.5 and R5.5 Series Reduction Starting Motors
Media Number -SENR3828-02 **Publication Date -01/07/1999** **Date Updated -09/10/2001**

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Starting Motor - Assemble

SMCS - 1453-016

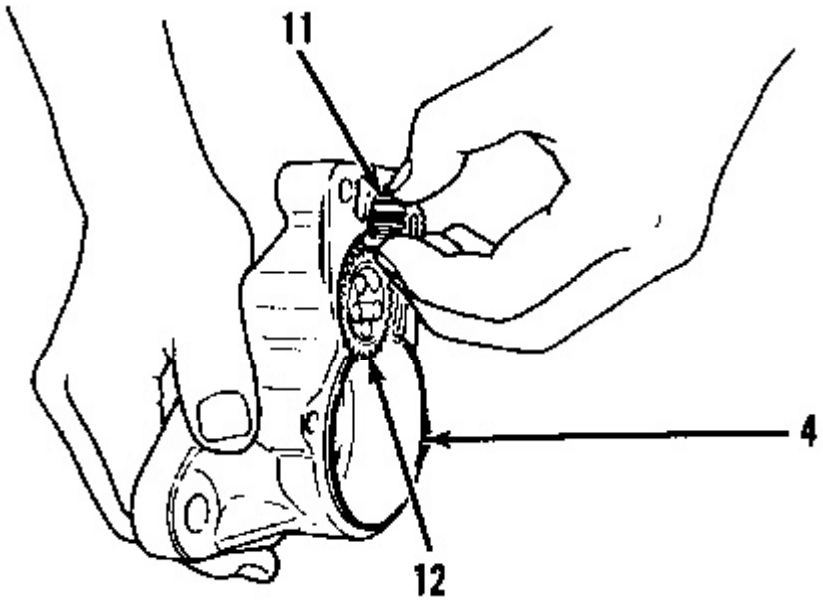

Illustration 1 g00585386

1. Install the return spring (15) into the solenoid (2) .

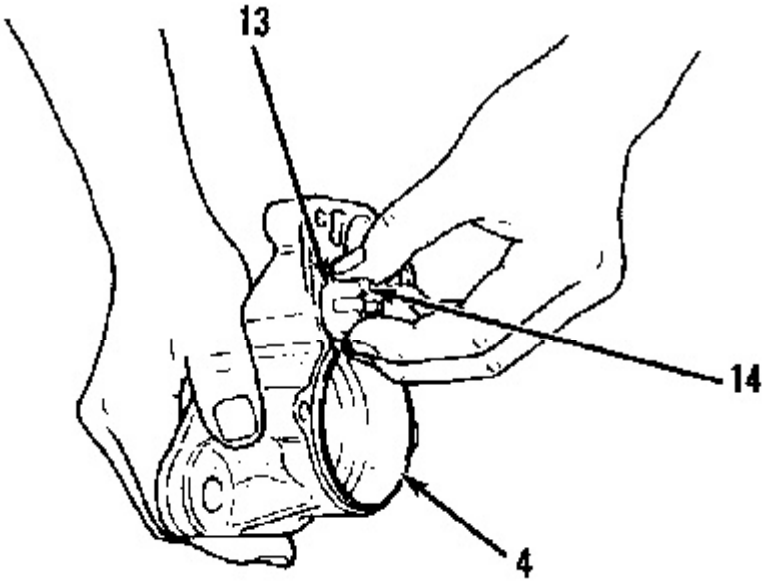

Illustration 2 g00585389

2. Install the rollers (14) and the retainer (13) into the drive end housing (4) .

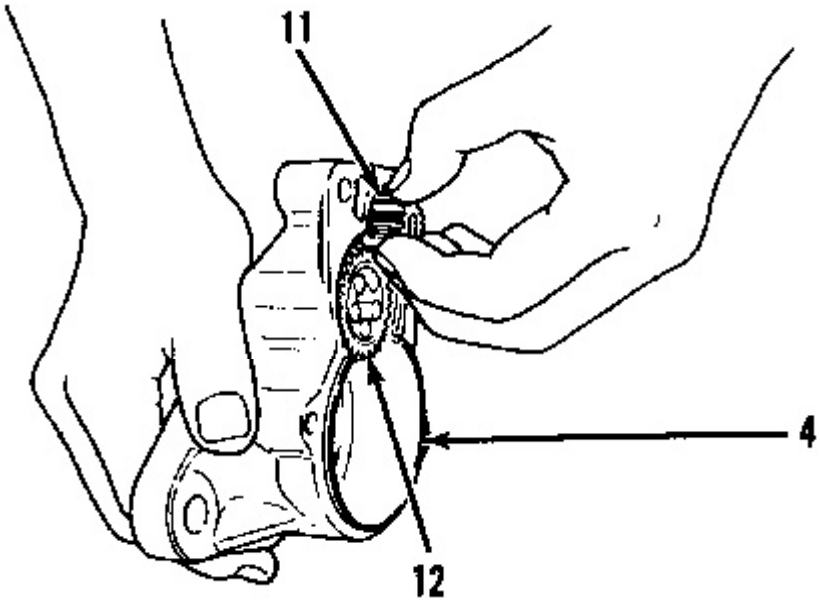

Illustration 3 g00585386

3. Put the idler gear (12) and the armature reduction gear (11) onto the drive end housing (4) .

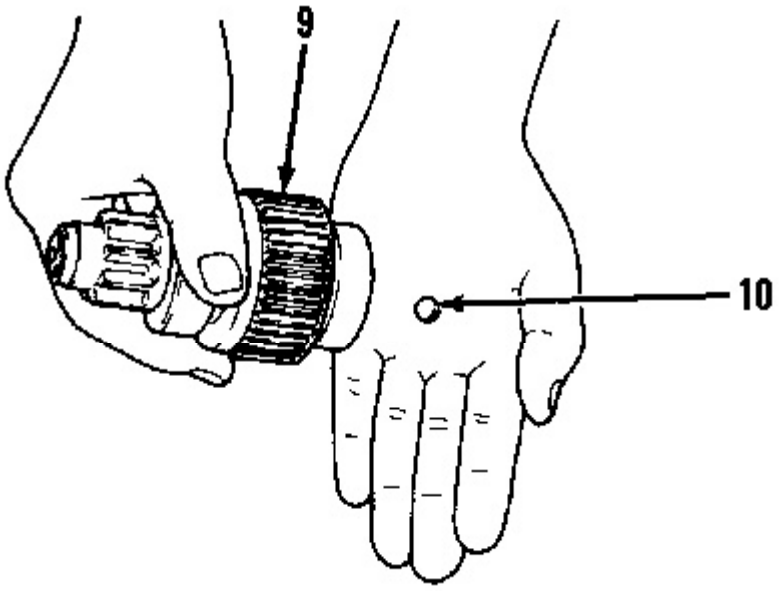

Illustration 4 g00585348

4. Put the steel ball (10) into the overrunning clutch (9) .

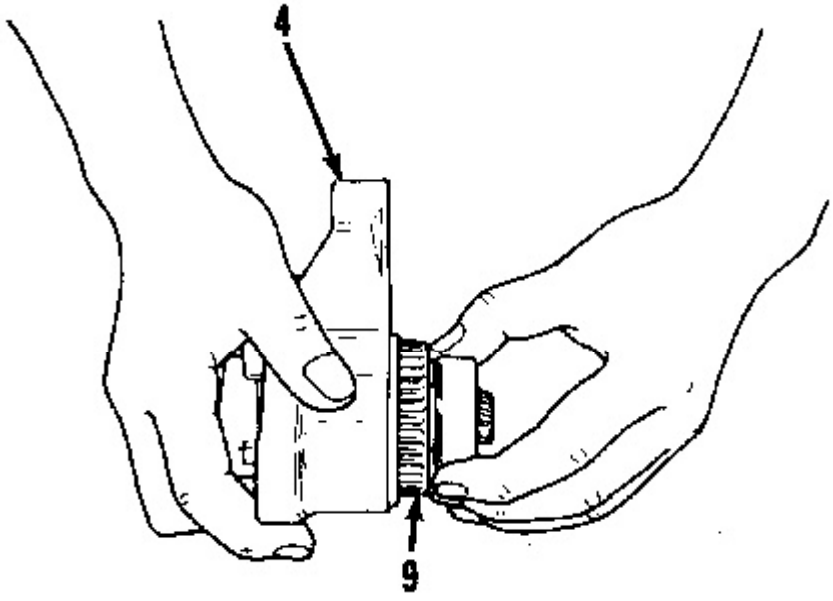

Illustration 5 g00585337

5. Put the overrunning clutch (9) into the drive end housing (4) .

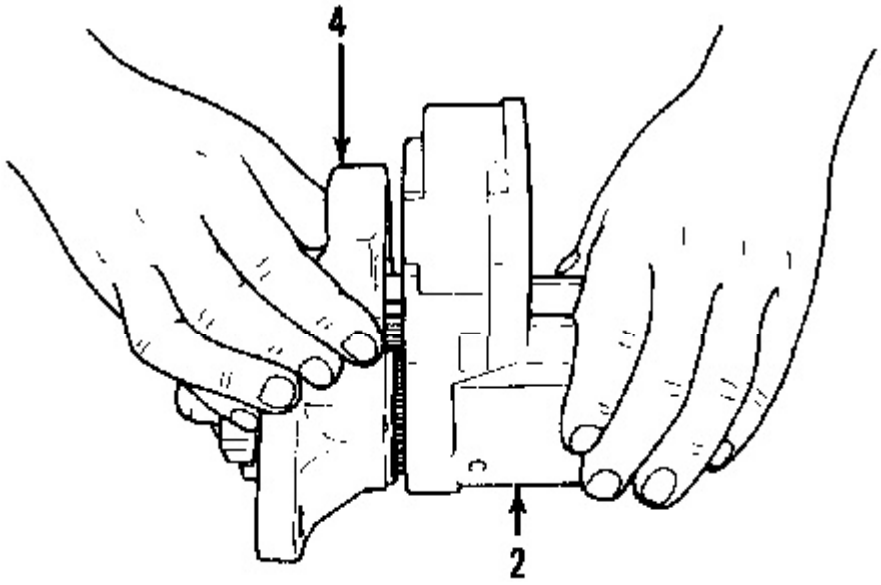

Illustration 6 g00585327

6. Put the drive end housing (4) on the solenoid (2) and install the screws. Tighten the screws to a torque of 0.6 N·m (5.3 lb in) to 0.9 N·m (7.9 lb in).

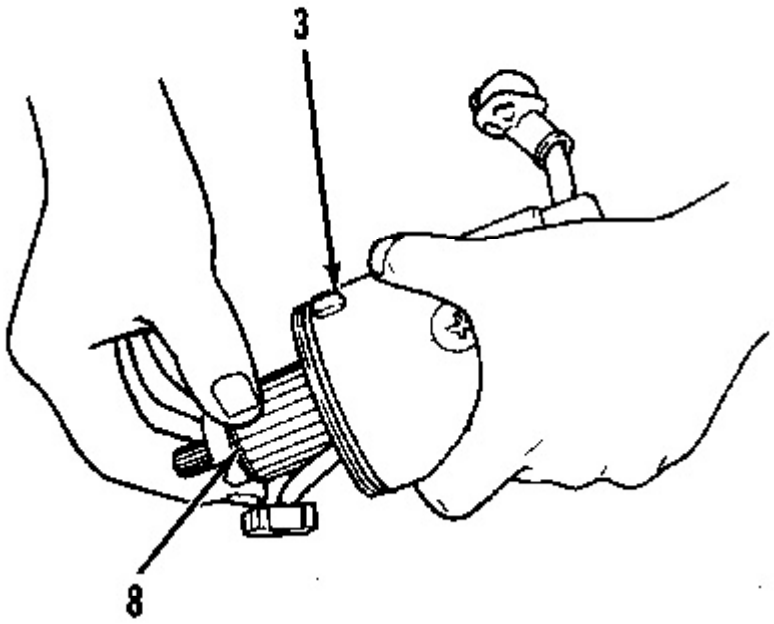

Illustration 7 g00585312

7. Put the armature (8) into the case of the starting motor (3) .

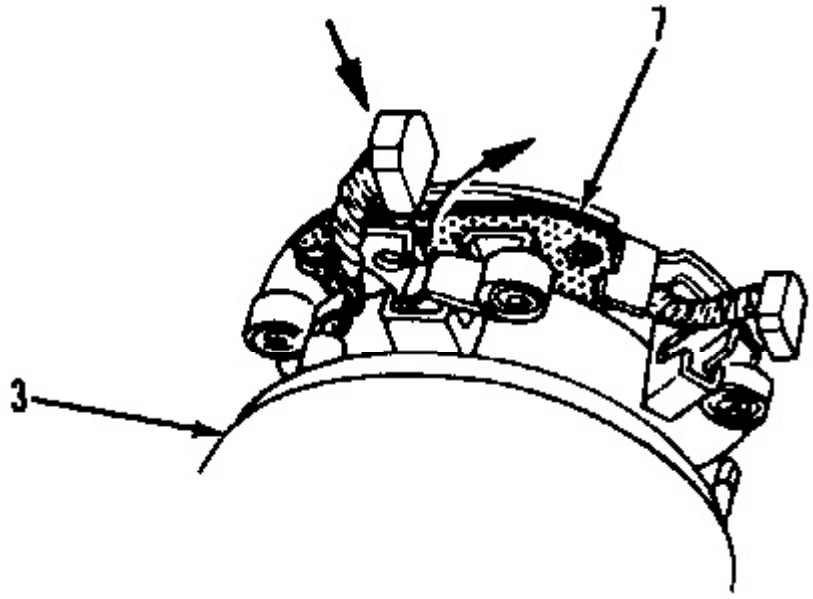

Illustration 8 g00585753

8. Put the brush holder (7) in position over the commutator. Put the positive brushes, which are connected to motor case (3) into the positive holders. The positive holder is separated from the plate by an insulator. Put the negative brushes into the negative uninsulated holders. The negative brushes are connected to brush holder (7) .

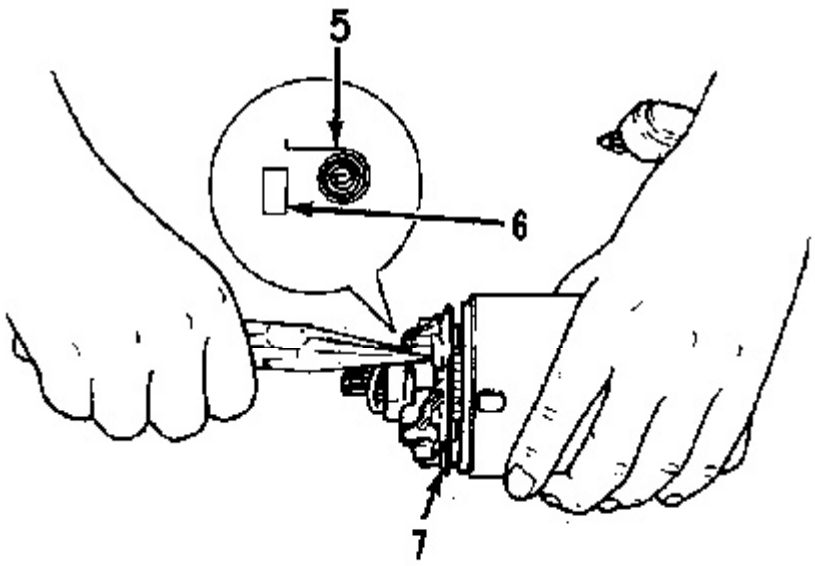

Illustration 9 g00585304

9. Make sure that the wires for the positive brush lead are not grounded. Put the brush springs (5) on top of the brushes (6) with a pair of long nose pliers. Make sure that the brush holder (7) and the commutator are free of oil.

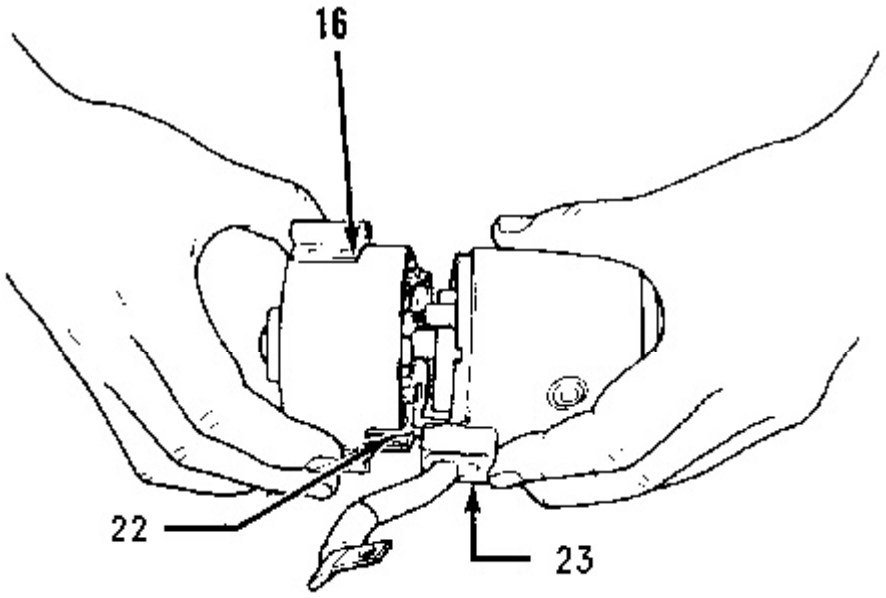

Illustration 10 g00586185

10. If the motor case has an end frame (16), install the end frame onto the case of the starting motor. Tab (22) that is on the end frame must line up with the lead wire grommet (23) that is on the case of the starting motor.

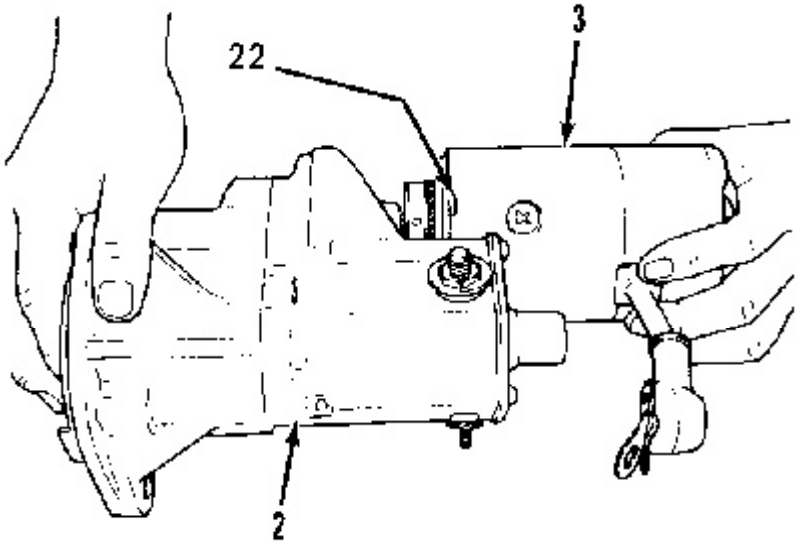

Illustration 11 g00586190

11. Put the case of the starting motor (3) in position onto the solenoid (2). Engage the TAB (22) on the case of the starting motor with the notch in the solenoid. Install the through bolts and tighten the through bolts to a torque of 1.5 N·m (13 lb in) to 2.4 N·m (21 lb in).

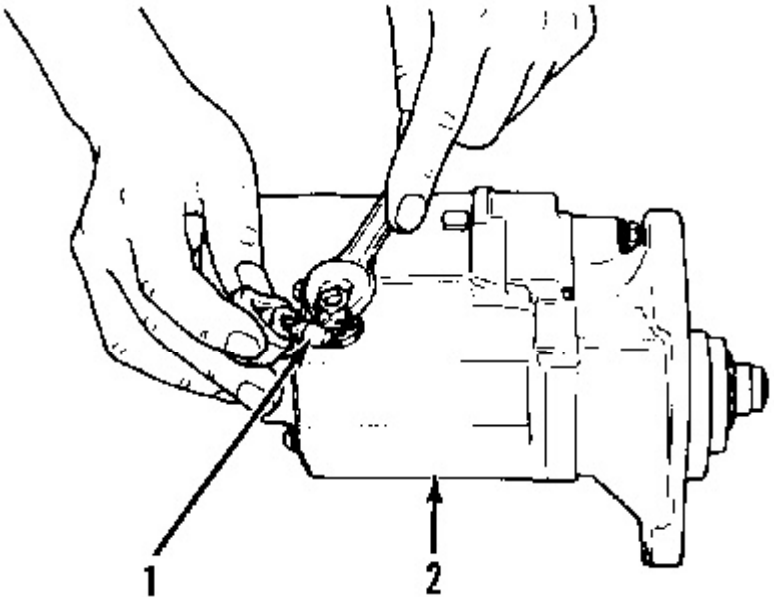

Illustration 12 g00585273

12. Connect the lead wire (1) to the motor terminal of the solenoid (2) .

Install the starting motor onto the machine.

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Product: BACKHOE LOADER
Model: 416B BACKHOE LOADER 8ZK01989
Configuration: 416B Backhoe Loader 8ZK00001-05999 (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly
RA1.2, R1.4, R2.0, R2.2, R2.5, R2.7, R3.0, R4.5 and R5.5 Series Reduction Starting Motors
Media Number -SENR3828-02 **Publication Date -01/07/1999** **Date Updated -09/10/2001**

i01107169

Starting Motor - Disassemble

SMCS - 1453-015

Remove the starting motor from the machine. The procedure for removal of the starting motor may vary slightly with a different series of starting motor.

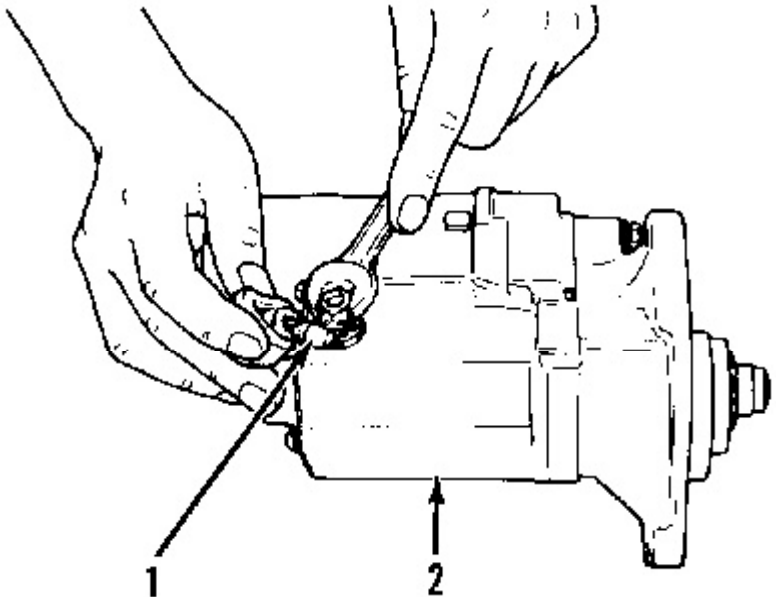

Illustration 1 g00585273

1. Disconnect the terminal lead wire (1) from the solenoid (2) .

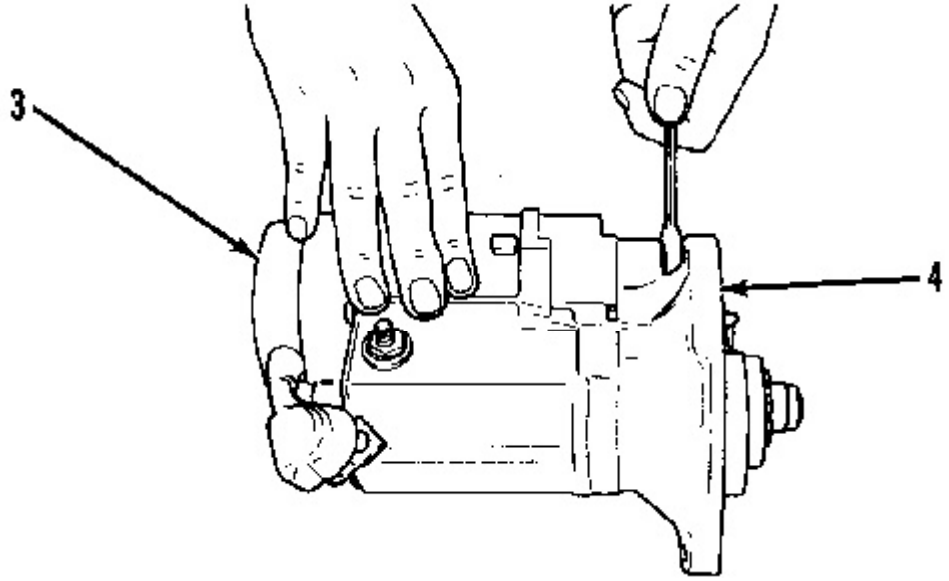

Illustration 2 g00585281

2. Remove the through bolts from the drive end housing (4). The through bolts holds the case of the starting motor (3) onto the solenoid.

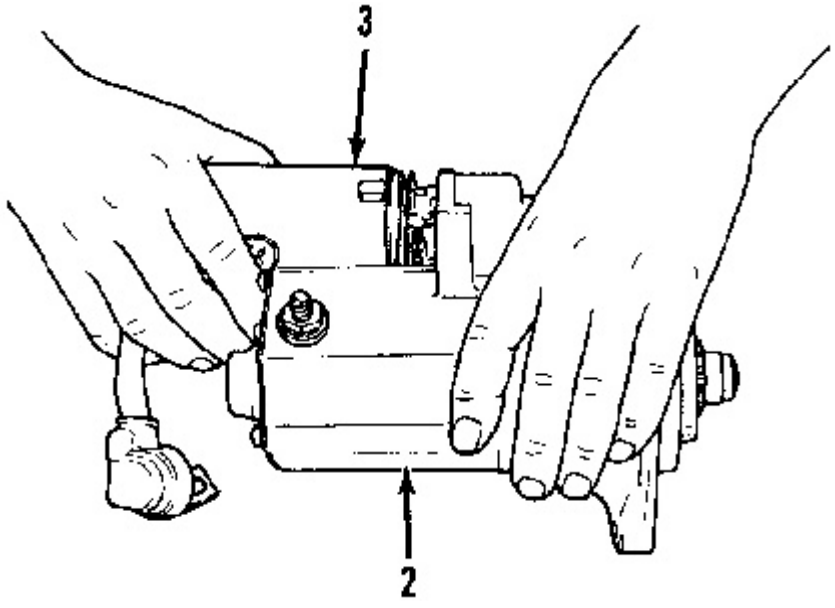

Illustration 3 g00585290

3. Remove the case of the starting motor (3) from the solenoid (2) .

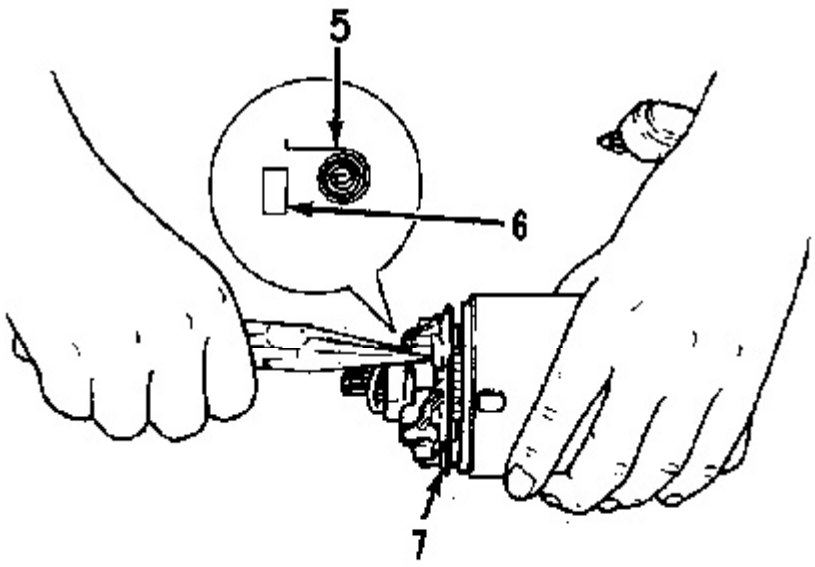

Illustration 4 g00585304

4. If the case of the starting motor has an end frame, remove the end frame. Release the tension of the brush springs (5) with a pair of long nose pliers. Pull the brushes (6) away from the commutator. Remove brush holder (7) .

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